

## WHAT IS CLAIMED IS:

1. A vibration detecting system of a resilient body for detecting vibration of the resilient body, comprising:

5 a detector for detecting the vibration of the resilient body and outputting a detection signal in accordance with the vibration; and

a magnetic circuit having a primary coil and a secondary coil, the primary coil and the secondary coil being in close electromagnetic connection,

wherein the vibration of the resilient body is detected using an output signal generated in the secondary coil when the detection signal from the detector is received by the primary coil.

2. The vibration detecting system of a resilient body according to claim 1, wherein the detector is attached to the resilient body and is constructed of a piezoelectric element or a strain detecting element.

3. The vibration detecting system of a resilient body according to claim 1, wherein the detector is located around the resilient body and is constructed of a non-contact detecting element for detecting the vibration of the resilient body in a non-contact manner.

4. A vibrating contact detection probe, comprising:

a shaft-shaped stylus having a contact portion to be in contact with a workpiece ;  
a vibrator for causing resilient vibration to the stylus when electrical alternating current energy is applied thereto;

a detector for detecting the action of the vibration changing in accordance with contact of the contact portion with the workpiece;

a vibration energy transmitter for applying the electrical alternating current energy to the vibrator;

a detection signal transmitter connected to the detector; and

a stylus support and a stylus structure being mutually fitted,

the vibration energy transmitter having a first primary magnetic circuit having a

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first primary coil connected to a vibration energy source and a first secondary magnetic circuit having a first secondary coil connected to the vibrator,

the detection signal transmitter including a second primary magnetic circuit having a second primary coil connected to the detector and a second secondary magnetic circuit having a second secondary coil for fetching the detection signal,

the stylus, the vibrator, the detector, the first secondary magnetic circuit and the second primary magnetic circuit being integrated on the stylus structure, the first primary magnetic circuit and the second secondary magnetic circuit being integrated on the stylus support,

wherein, when the stylus structure and the stylus support are fitted, electromagnetic connection is established between the first primary magnetic circuit and the first secondary magnetic circuit and between the second primary magnetic circuit and the second secondary magnetic circuit and mechanical position of the stylus relative to the stylus support can be reproduced.

5. The vibrating contact detection probe according to claim 4, wherein the second primary magnetic circuit and the second secondary magnetic circuit are disposed without being in electromagnetic connection with the other electromagnetic system of the stylus structure and the other electromagnetic system of the stylus support.

6. The vibrating contact detection probe according to claim 4, wherein the respective pairs of the first primary coil and the secondary coil and the second primary coil and the secondary coil are disposed coaxially along an axial direction of the stylus.

7. The vibrating contact detection probe according to claim 5, wherein the first primary coil and the secondary coil and the second primary coil and the secondary coil are constructed of a toroidal coil.

8. The vibrating contact detection probe according to claim 4, wherein the stylus structure and the stylus support are formed by a pair of structures fitted to form a cylinder or a polygonal tube which is separated in parallel with a central axis thereof.

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9. The vibrating contact detection probe according to claim 4, wherein the stylus structure and the stylus support are formed by an inner and outer coaxial cylinders having a common axis or a pair of coaxial inner and outer polygonal tubes.

5 10. The vibrating contact detection probe according to claim 4, further comprising an amplifier of the detector, the amplifier being driven by a power generated by the first secondary coil using a part of electrical alternating current energy.

10 11. The vibrating contact detection probe according to claim 4, further comprising an amplifier of the detector, the amplifier being driven by a power generated using a part of electrical alternating current energy supplied by a third coil independent of the first primary and secondary coils and the second primary and secondary coils.

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